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From Organization: MALS16 (Forward) Date: 7/26/2010

Questions/Remarks #1:
I like the idea of more room for the technician to work in; however, the shower needs to have some sort of drainage and/or containment set up.

NI Engineering Response to #1: Plan is to have a portable eyewash station but no shower. The pressurized unit shown on original concept layout can be replaced with gravity-feed model if MALS wants unit that's easier to maintain. (Further information on eyewash discussed in Questions/Remarks #7, below.)

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From Organization: USMC Date: 7/27/2010

Questions/Remarks #2:
Overall, the working design looks more comfortable to work in and more suitable. I would not place alarms on the doors, due to most battery vans are complexed with the work center and one door is usually removed for this and the other is sometimes used to for Marines picking up and dropping off batteries. It would be just as easy for us to use the same trip line as we currently use on the ceiling. The other concern I have, is where the deep sink will get a water source from. Most van pads do not have plumbing and would make van complexing even more difficult. Even though it's not always easy to flush the system during certain seasons, like in the winter, it would still maintain the ability to keep the battery facility mobile. The shelves are much better than what we currently are using. Some of us though, only service large batteries and would not be able to utilize the top shelves. If the shelves were extended to be wider, and the storage cabinets were above the shelves, in my opinion it could be more beneficial. There is not too much that we store in the battery lockers, and most that is stored is not nearly as heavy as batteries. Another idea I have is for the ability to have a wireless audio alarm, that would be triggered form the van, but it would sound in a work area. Sometimes it is not practical to run wire to an external alarm. Also the alarm could always be moved to where Marines could hear it in the event of an emergency. Thank you for the opportunity to provide my input.

NI Engineering Response to #2: Regarding alarms… still gathering input as to whether these will be added to design. I have not found it as a hard requirement in the battery manual and other reference. But if that is requested, alarm(s) of various forms could be added. Could have a manual alarm triggered by simple red mushroom switch near door or charging station, or could have a smoke/fire alarm that's automatically tripped, or could even add hydrocarbon detector as an option (similar to FS01). But, again, did not add alarm because not a hard requirement. Regarding water to sink, there is a reservoir inside the sink unit to provide water through internal sink pump when outside water is not available (hose fitting will also be on design for outside water). Regarding top shelves, can check with shelf manufacturer for availability to add cabinet doors on top shelves so they could be used for storage.

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From Organization: USMC Date: 7/27/2010

Questions/Remarks #3:
The current alarm system that we have wasn't shown in the diagram. Is this alarm still going to be present or is it being replaced by another alarm system? In an emergency, it makes sense to pull the overhead string that we current have in place now. The other thing was placement of the battery chargers. If the battery chargers were placed below the batteries that would prevent the Marines from having to always bend down to pick up the batteries, placing less stress on the back.

NI Engineering Response to #3: Re alarms, see Question/Remark #2 above. Re shelves for charger, Present layout follows previous LA01 shelf layout and what we observed in the MALS. We saw chargers on top shelf and batteries on shelves below. However, if better ergonomically to put batteries on top shelf, we can design pass-through holes on top shelf that would be used not only for the charger leads to the batteries, but also to pass-through the power cords to the chargers if placed on the lower shelf. That way you can decide at your location which shelves to use for each purpose.

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From Organization: USMC Date: 7/27/2010

Questions/Remarks #4: Clear and efficient design.

From Organization: MALS 16 (FWD) Date: 7/27/2010

Questions/Remarks #5: -Is the alarm lanyard not going to be incorporated into this new design? Why not?
-Have the Plexiglas shields/doors been deemed unnecessary? If so, why?

NI Engineering Response to #5: Re alarms, see Question/Remark #2 above.
Re Plexiglas doors; on the LA01 they were designed to keep the charging area separate from the personnel area because hydrogen was expected to be produced from batteries during charging. Hence the reason for the booth, explosion-proof fans, and explosion-proof receptacles. But due to this LA02 being used ONLY for sealed batteries (SLAB/VRLA: Sealed Lead-Acid, Valve-Regulated Lead-Acid type) there is normally no hydrogen released during charging. So, the booth with Plexiglas doors, explosion-proof fans, and explosion-proof receptacles are not required.

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From Organization: JSF Date: 7/28/2010

Questions/Remarks #6:
Portable Eye Wash Station too low. You will require someone whose vision is already impaired to bend lower then normal to wash eyes. The station also sits very close to the counter top which might cause tech to hit head. I suggest raising the station above counter top height by sitting Eye Wash station on raised bracket and securely attach it. This allows tech to bend normally and not risk head injury.

NI Engineering Response to #6: The pressurized unit shown on original conceptual layout can be replaced with gravity-feed model if an easier to maintain unit is desired. A gravity-feed unit could be attached to the wall and positioned at higher point than the pressured Bradley model that sits on floor. Most comments we've received prefer gravity-fed model if using a portable model. (Background: Regarding height of currently shown pressurized eyewash--the technician at Bradley said height for eyewash faucets was within regulation if pressurized bottle was set on floor. But if we wanted to add the wheeled base (an option they offer) it would raise it from the floor a few inches. The wheeled base is normally used to make the move to a sink to dump and refill water easier.) (Further information on eyewash discussed in Questions/Remarks #7, below.)

Regarding the use of this LA02 design for the Lithium-Ion type battery used on JSF: This LA02 design is not intended for Lithium-Ion. The current battery manual we used as a reference for this design, NAVAIR 17-15BAD-1 did not have a specific section for Lithium-Ion. A previous MF design for Lithium-Ion has been done (the LN01). The LN01 was designed for a specific location and was not planned for MALS use--at that time. If a battery MF is needed for Lithium-Ion charging at the MALS we would recommend to our program office that a new configuration design be created (likely named LN02) and review current requirements for Lithium-Ion storage and charging due to the new deployment of this type of battery in the DOD.

From Organization: HMX-1 Date: 7/28/2010

Questions/Remarks #7:

Question 1. Recommend move fire extinguisher away from circuit breaker panel since that is a primary source of fire hazard. This is like putting a fire extinguisher on a stove. After the fire starts, you can't reach the extinguisher.

--Response to Q1: Yes, That can be done. Right now it's shown on the power entry panel cover--but we can find another spot. There are two in this MF and the other one is next to the sink.

Question 2. Recommend replacing pressurized eye wash with standard green gravity eye wash station. There is no advantage to pressurized station and it costs much more.

--Response to Q2: Yes, we can use a gravity eye wash that is in the stock system. The Battery manual does not require the unit to be pressurized. So this would also eliminate the need for portable air compressor (subject of next question).

Question 3. Eliminate compressor (see note two).
--Response to Q3: See above response 2.

Question 4. Install sectioned reservoirs on charging shelf with gravity fed water supply to allow personnel to immerse batteries without having to move them. It makes no sense for a technician to pick up and move a battery which is experiencing thermal runaway.

--Response to Q4: Before considering this design concept, I would like to poll the battery shop users at the MALS to find out how frequently thermal overloads occur for the sealed lead acid batteries. (Note: We are not including Ni-Cad batteries since this MF will not charge/store the standard liquid electrolyte Ni-Cads). If thermal runaways are rare events for Sealed Lead-Acid batteries, it may be why the battery manual (NAVAIR 17-15BAD-1) provides instructions to cover in a towel and remove to a dunk tank outside the charging area. Perhaps the thermal runaway problem is more prevalent with Ni-Cads? For vented Ni-Cads would agree because they are much more hazardous.

Question 5. Eliminate dunk tank (see note four).

--Response for this question is tied to Q4 above. But the battery manual mentions it so we included it.

Question 6. Add thermal alarm system to detect runaway in absence of technician. Each charging station should have a thermal couple which should be placed on the battery during charging. If the battery reaches a dangerous temperature the thermal couple would trigger an alarm.

--Response to Q6: Yes, the standard charger (MSD-970-1) has a thermal sensor which must be placed on the battery during charging. If the battery temp goes beyond the heat threshold of the sensor tied to the charger, the charger turns off charge to battery. I will have to research to see if an alarm is already present on the standard charger--or an alarm could be tied to this.
But would it be necessary to set off an alarm if the charging is turned off automatically by the charger? Seems that the danger would be prevented as long as the operator of the charger attached the battery thermal sensor as he/she should.
But I understand you are probably anticipating the possibility of the battery servicer forgetting that step of attaching the sensor and walking away to leave the station unattended. Good point.
We could add an alarm just in case. However, the reason those additional safeguards were not incorporated into the LA02 conceptual design is due to the low hazard for fire during the thermal runaway of a Sealed Lead Acid Battery. As stated in a technical bulletin from one

of the battery manufacturers (Concorde), the thermal runaway for a sealed lead acid battery "..will reach only a relatively moderate internal temperature (~260F) at which point the water in the electrolyte vaporizes and the battery vents steam." I can provide the full Technical Bulletin (Concorde #2, Nov 1997) that describes thermal runaway for both Sealed Lead Acid batteries (VRLA) and also Ni-Cad battery thermal runaway. The bulletin tells us that Ni-Cad batteries have a real danger of fire, arcing, and explosion. But we are NOT charging Ni-Cads in this LA02 config.

--Response to Q6 (continued): Alarm is not specifically required for this type of facility (sealed batteries), but we can add alarms to this MF as a precaution—if most users see a need. Can add a smoke/fire alarm and a separate manual alarm. And if there is additional support for it, we can add a hydrocarbon alarm that can detect an accumulation of hydrogen and turn on a fan automatically. But Hydrogen is not released from these SLAB/VRLA batteries unless they are over-charged. (Also see response to Question/Remark #2).

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From Organization: MALS 26 Date: 7/28/2010

Questions/Remarks #8:
No changes needed, the proposed configuration looks good.

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From Organization: MALS-24 Date: 7/28/2010

Questions/Remarks #9:

My first concern is how is the alarm (if at all) connected to the Eyewash/Shower?

Secondly, with the position of the eyewash next to the counter top, it seems that a person with limited/no vision has a higher risk of hitting their head on the countertop in an emergency situation.

NI Engineering Response to #9: Alarm requirement is not listed for our type of facility (Non-dedicated Battery Servicing Facility in a regular maintenance van.) There is no alarm shown for the eyewash on concept design. The reference that describes our facility and allows us to use portable eyewash is NAVAIR 17-15BAD-1, Appendix D (issue date Sep 2009). Also, please see responses to questions above regarding eyewash. The pressurized unit shown on original concept layout can be replaced with gravity-fed model if MALS wants unit that’s easier to maintain. If the users of this new LA02 battery MF see a need to have an alarm tied to the eyewash, we could research portable models to see if one is available. However, all models of portable eyewashes looked at so far do not have an alarm connection.

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From Organization: USMC Date: 7/29/2010

Questions/Remarks #10:

The new layout idea for the SLAB locker looks good in general, but there could be some issues with safety. I know there isn't much thermal runaway possibilities with the Lead Acid Batteries, but I do know that anything could and at some point in time will happen. This raises the concern of having a small portable eye wash station. From the look of the pictures it seems to be at a good location, but possibly too low to the floor and harder to find in the situation that something hazardous does get in your eyes. Also, I'm not sure about how easy it would be to activate this eye wash station in the event of potential blindness. It looks like the same type of valve used on our current stations, but again with it being so low, there is a possibility of a worker hitting his head on the counter while bending down to the level of the station itself. The layout overall looks great, but I personally have more confidence in being able to find the built in, eyewash stations we currently have. If it is possible to have the same style of eyewash station that we currently have, mounted on a counter top in that same proposed location of the van with a small interchangeable eyewash solution tank underneath the counter, I believe it would be a safer, more user friendly working environment for charging our batteries.

NI Engineering Response to #10:
As mentioned in response to ‘Questions/Remarks #9’ above, the Portable eyewash station is allowed for our type of MF facility per reference cited. Another reason to use portable eyewash is that the water is self-contained and does not require installation of a pressurized plumbing system similar to that used in NB03/LA01 design. (That design included a complex system of air compressor to pressurize a tank reservoir, a full shower, and permanent eyewash. NB03/LA01 also had multiple alarms specified by Crane Indiana requirements at the time of design in 1985.) The complexity of this eyewash/shower system on NB03/LA01s has proven to be difficult to maintain when in use in the fleet. So for the reasons of (1) the battery manual allowing us to use a portable eyewash, (2) the lower maintenance required for a simple portable eyewash, and (3) the lower risks associated with SLAB battery thermal runaway due to its design, we recommended the use of a portable eyewash. (The lower risks are described in Concorde Tech Bulletin #2, which we can provide.) We can install either a gravity-fed model or portable pressurized tank model. The original design concept layout included the portable pressurized tank model because having the water under pressure would provide more effective irrigation to the subject and the tank also had a deluge hose to wash off additional areas of body. But, gravity-fed model is allowed per the manual reference and would require less maintenance.

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From Organization: MALS-49 Date: 7/29/2010

Questions/Remarks #11:

I think the engineers should look at the possibility of retaining the internal water tank and shower while keeping the design similar to what is shown in the drawings. Removing the water tank adds a plumbing requirement for van pads both in garrison and forward and it appears there is plenty of room to keep the tank.

An e-mail will be forwarded through the Chain of Command to the MF Program Office with a PowerPoint displaying the changes to consider. Those changes are listed below.

- Incorporate the eyewash sprayers into the sink.
- In the corner where the portable eyewash system is, install the water tank with a small compressor mounted above the tank to pressurize it.
- Widen the battery storage shelves.
- Make the tops shelf in the battery storage area a cabinet for supply storage.
- Remove the wall locker, the battery locker doesn't require that much storage.
- Put the shower in the corner where the wall locker is.
- Retain the current alarm system where the Marine can simply reach above his head and grab the alarm. If the proposed battery locker is complexed, ½ of the alarm system will be removed with the door and the other ½ will be accidentally activated as batteries and picked up from, and delivered to, the battery locker.

NI Engineering Response to #11:
Thank you for your input.
Want to stress that this LA02 facility is ONLY for SEALED batteries (our sealed battery usage is lead-acid, also known as SLAB/VRLA type). Ni-Cad or vented-lead-acid battery (liquid-electrolyte) charging require use of the existing NB03/LA01 configurations.

Secondly, we are reading from the NAVAIR 17-15BAD-1 battery manual, Appendix D (issue date Sep 2009). The latest battery manual revision available when concept design was created. And we also reviewed the OSHA requirement 29-CFR-1910.151(c) which requires employers to provide facilities to flush eyes. Per this OSHA requirement, whether Plumbed or Portable eyewash (or shower) is specified depends on hazard that employee is exposed to.

We realize that there may be Safety Office personnel at different bases who will use the general references they have available and also interpret their references differently. If this requirement (for full shower) is coming from your Safety personnel at your base, I recommend having them cite their requirements to have a fully plumbed shower/eyewash, in writing, to us here at North Island engineering so we can address/answer their REFERENCE-supported requirement. We would rather answer these questions up-front from Safety-Office or Industrial-Hygienist personnel before the design is released for the first prototype build. There are General Battery room references that

apply to battery-charging facilities for STATIONARY battery installations. That is not the type of facility that LA02 will be. We are using the reference that is specific to the usage of our SLAB-type battery: “Navy and Air Force Aircraft and Aircraft Support Equipment Storage Batteries” (title of NAVAIR 17-15BAD-1 manual)

Regarding request to widen the battery storage shelves that can be done. A second concept drawing will be done (at end of response period) that could show that.

Again, we welcome your input as it helps us design this configuration. Thank you.

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From Organization: 3rd MAW Date: 7/30/2010

Questions/Remarks #12:

1) There should be a lanyard-activated audible alarm system similar to the current config. Like my airbag in my car, I have never used it but I am glad it's there.
2) I would rather see the batteries on charge using the more ergonomical waist-high shelf vice bending/ squatting with a heavy battery to the lower shelf.

NI Engineering Response to #12: Regarding the question about Alarm system, please refer to NI response for ‘Questions/Remarks #2’ above. Regarding placement of batteries on shelves during charging, please refer to NI response for ‘Questions/Remarks #3’, above.

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From Organization: MALS-36 Date: 8/2/2010

Questions/Remarks #13:

We looked at the configuration and based on what we can see in the picture, the only recommendation that we have is accommodating more MSD-970 charger stations. With that said, I can see they are allowing for two MSD chargers, and two case charger stations for a total four charging stations. If we can put two MSD chargers on the counter where the two case chargers currently sit in the diagram without interfering with the exhaust fan, then we are happy with the new configuration. Basically can MSD chargers fit where the case chargers are placed in the diagram?

See slide four to understand what we are talking about.

NI Engineering Response to #13: Regarding accommodating more MSD-970 charger stations, yes, you can position the chargers according to your needs. You can position MSD-970 chargers where the case chargers are shown. The Case charger, CA1550, was shown in the LA02 layout views because we saw them stored in the existing LA01 MF. (The Case chargers have limited application for charging per the 17-15BAD-1 manual, paragraph 3.8.4.2, page 3-7). Receptacles for the chargers will be positioned on wireway just above the charging bench. Also, please refer to NI response for 'Questions/Remarks #3', above.

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From Organization: MALS-14 Date: 8/2/2010

Questions/Remarks #14: (numbered 1 thru 4)
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1. There needs to be room for an additional two charging stations.

2. Strictly speaking on Lead Acid batteries, there is no need for a sink or a dunk tank. The NA17-15BAD-1 doesn't associate Thermal Runaway with Lead Acid chemistry batteries. I understand that the ultimate goal is to designate this MF configuration as multi-chemistry, so the sink might have to stay (the battery manual does leave a little wiggle room for the SNCBs potential for thermal runaway). Removing the sink would reduce the amount of future maintenance required on the plumbing and open up more counter space for the two additional chargers.

3. The pressurized eyewash station included in the drawings is overly complicated. Bradley makes a sufficient gravity operated eyewash station (01-234-1796) that has one moving part. Also, the proposed eyewash doesn't have any means by which to collect the runoff when the station is used or tested. This would add a slip hazard to an already dangerous situation. The gravity fed station has a collection basin that can be directed into a bucket.

4. The air compressor can be deleted with the removal of the sink and switching the eyewash station to gravity feed.

NI Engineering Response to #14:
---Regarding placement of chargers (Q1), please refer to NI response for 'Questions/Remarks #13', above, and 'Questions/Remarks #15' below.

---Regarding need for sink and dunk tank (Q2): The sink is not specifically required under Appendix D of the 17-15BAD-1 battery manual for a non-dedicated servicing facility. You are correct that the water and dunk tank requirement is cited under the Nickel-Cadmium chapter of the battery manual (chapter #4). The sink unit shown in the concept drawing was included as a convenience to the user in case they needed to cool an over-heated battery or cleaning of the battery was necessary before charging. The sink unit shown has an under-counter reservoir and can also be connected to water via a hose fitting located on outside wall of MF. But if a permanent water connection is

not available, you would draw water from the reservoir via the electric pump inside the sink unit. If other MALS agree that a sink is more trouble than it is worth (extra maintenance to provide and drain water), we can remove sink unit and add more counter space.
---Regarding whether the LA02 configuration is planned for “multi-chemistry” (Ni-Cad or vented Lead-Acid battery use) Q2: No, it is not to be used for those type batteries. It can only be used for sealed battery types as described in Appendix D of the 17-15BAD-1 battery manual (paragraph D2.2 for non-dedicated).
---Regarding the pressurized eyewash (Q3 & Q4): the majority of input from the MALS recommends using gravity-type eyewash. The Bradley pressurized eyewash will be replaced with gravity-type model that can be obtained in the stock system. Therefore, no air compressor is needed.

Thank you for your input.

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From Organization: MALS-29 Date: 8/16/2010

Questions/Remarks #15:

Battery P/N D8565/1-2 come in sets of three and often in multiple sets. As the layout is right now only four batteries can be charged. If the general storage cabinet were to be removed and the sink placed by the battery storage shelves there would be enough space to place two more chargers. This would allow for two sets of D8565/1-2s to be charged at the same time. As in a previous remark if storage is still required it seems possible to make the top shelf of the battery storage shelves into a general storage cabinet. Six chargers would increase through put making it easier to adjust to OMA operational tempo no matter the platform of aircraft being supported.

NI Engineering Response to #15: Due to the limitations of our small 8x8x20 container, if we add more charging stations, we have to get rid of something else. Remarks have been received suggesting removal of either the storage cabinet or the sink. If I obtain additional remarks from MALS locations that agree the storage cabinet or sink is not necessary, and if additional remarks indicate more charging stations would be a better use of that space, we could omit one of these items.